

**REMARKS**

Claims 1-20 are pending in the application.

Claims 1-3 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the Applicants regard as their invention. It is believed that this Amendment is fully responsive to the Office Action dated **July 19, 2002**.

**Objection to the Drawings**

The Examiner has objected to Figs. 1-7b, indicating that Figs. 1-7b should be labeled as required by 37 CFR §1.83(a).

Applicants respectfully traverse the Examiner's grounds for objection. 37 CFR § 1.83 (a) states that the drawings show every feature of the invention specified in the claims. Further, when conventional features are disclosed and not required for proper understanding of the invention, they should be featured as a labeled rectangular box.

In the case of figures 1-7b, all items illustrated have associated reference numerals with lead lines as required by MPEP § 608.02 (p) and (q) with no further labeling required. Therefore, applicants respectfully traverse the Examiner's objection to the drawings.

**Claim Rejections under 35 USC §112**

Claims 1-20 are rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to the rejection of claim 1 for failing to recite "any laser structure", claims 1-3 have been amended herewith.

In the embodiment in Fig. 1 of the present invention, the n-cladding layer 6, the n-light guide layer 7, the n-multiple quantum well active layer 8, the p-carrier blocking layer 9, the p-light guide layer 10 and the p-first cladding layer 11 constitute the first nitride based semiconductor layer. The n-current blocking layer 12 corresponds to the current blocking layer. The p-second cladding layer 14 in the striped opening 13 corresponds to the second nitride based semiconductor layer.

The n-cladding layer 6 corresponds to the first conductivity type cladding layer, the n-multiple quantum well active layer 8 corresponds to the active layer, and the p-second cladding layer 14 in the striped opening 13 corresponds to the second conductivity type cladding layer in our amended claim 1. The p-first cladding layer 11 corresponds to the second conductivity type cladding layer in amended claim 3.

As to the rejection of claim 2 for the "first layer" and the "second layer" failing to have clear antecedent basis, applicants have amended claim 2.

As to the rejection of claim 3 due to the specific order requirement stated for each layer, applicant's believe that the first and second nitride based semiconductor layers in claims 1 and 3 are formed in the same order as shown in the Fig. 1.

As to the rejection of claims 4-20 for failing to recite specific structure required by the laser device, applicant's amendments to claims 1-3 overcome this rejection of claims 4-20.

Therefore, withdrawal of the rejection of Claims 1-20 under 35 USC §112, second paragraph, is respectfully requested.

**Claims Rejections under 35 USC §102**

Claims 1-3, 7-13, and 15-16 are rejected under 35 USC §102(b) as being anticipated by Morita (U.S. Patent No. 6,232,623 B1).

Morita describes a semi-conductor laser device utilizing nitride-based compounds such as gallium nitride. Specifically, as illustrated in figure 1, this semi-conductor laser device has a AlGa<sub>N</sub> cladding layer (10), a GaN contact layer (11), and an insulating film (13) covering the AlGa<sub>N</sub> cladding layer (10) and GaN contact layer (11) with the exception of an opening where the GaN contact layer (11) exists. The shape of these respective layers forms a ridge (12). On top of the GaN layer (11) an electrode (14) is provided.

The present invention provides for an AlGa<sub>N</sub> cladding layer (7), a first GaN layer (8), covered by a current blocking layer (9). An opening ( $W_1$ ) is provided in the current blocking layer (9) which is significantly smaller than the width ( $W_2$ ) of the first GaN layer (8). Further, a second GaN layer (10) is provided on top of the current blocking layer (9).

Applicants respectfully traverse the Examiner's rejections of independent claim 1 and the claims dependent thereon. Morita does not disclose or suggest an opening ( $W_1$ ) provided in the current blocking layer (9) that is significantly smaller than the width ( $W_2$ ) of the first GaN layer (8). Further, Morita does not disclose or suggest a second GaN layer (10) provided on top of the current blocking layer (9).

Specifically, independent claim 1 patentably distinguishes over the prior are relied upon, by reciting,

"A semiconductor laser device comprising: a first nitride based semiconductor layer including a first conductivity type cladding layer and an active layer and containing at least one of boron, aluminum, gallium, indium and thallium; a current blocking layer, formed on said first nitride based semiconductor layer, having a striped opening; and a second nitride based semiconductor layer, formed on said first nitride based semiconductor layer in said striped opening, including a second conductivity type cladding layer and containing at least one of boron, aluminum, gallium, indium and thallium, wherein said current blocking layer includes a multilayer structure of at least one first layer of a nitride based semiconductor containing at least one of aluminum and boron and at least one second layer of a nitride based semiconductor containing indium and having a smaller band gap than said first layer.

Therefore, withdrawal of the rejection of Claims 1-3, 7-13, and 15-16 under 35 USC §102(b) as being anticipated by Morita (U.S. Patent No. 6,232,623 B1) is respectfully requested.

#### **Claim Rejections under 35 USC §103**

First, claims 5 and 18-20 are rejected under 35 USC §103(a) as being unpatentable over Hayashi et al. (U.s. Patent No. 6,319,742 B1).

Regarding claim 5, the Examiner argues that discovering an optimum value of a "result effect variable" involves only routine skill in the art.

Considering the previous discussion related to the fact that Hayashi et al does not disclose the blocking layer (10) being composed of two distinct layers, and, most importantly, Hayashi et al. does not describe the second layer of a blocking layer having a smaller band gap than the first layer, as recited in claim 1, the allegation of discovering an optimum value thereof is irrelevant since claims 5 is allowable by virtue of its dependence upon an allowable independent claim..

Regarding claims 18-20, the Examiner argues that discovering an optimum value of a

"result effect variable" involves only routine skill in the art.

For the reasons previously discussed, Hayashi et al. does not describe the second layer of a blocking layer having a smaller band gap than the first layer, as recited in claim 1, the allegation of discovering an optimum value thereof is irrelevant since claims 18-20 are allowable by virtue of their dependence upon allowable independent claim.

Second, claim 17 is rejected under 35 USC §103(A) as being unpatentable over Hayashi et al. (U.S. Patent No. 6,319,742 B1) in view of Tsujimura et al. (U.S. Patent No. 6,265,287 B1).

Tsujimura et al. describes a semiconductor laser having a first light guide layer (25) and a second light guide layer (27).

The Examiner has supplied no reason to modify Tsujimura et al. and is essentially asserting that one of ordinary skill in the art would do so simply because it is disclosed. As indicated in MPEP § 2143.01, this argument is inadequate to establishing motivation to modify a reference. Therefore, the Examiner's motivation to combine the descriptions of Hayashi et al. and the Tsujimura et al. is respectfully traversed.

Third, claims 7-8 and 12-14 are rejected under 35 USC §103(a) as being unpatentable over Hayashi et al. (U.S. Patent 6,319,742 B1) in view of Shakuda (U.S. Patent No. 6,087,681).

Shakuda describes a semiconductor laser in which an active layer (7) has a smaller band gap energy which is sandwiched between a first cladding layer (6) and a second cladding layer (8), both of which have higher band gap energy.

Again, the Examiner has supplied no reason to modify Shakuda and is effectively asserting that one of ordinary skill in the art would do so simply because it is disclosed. Therefore, the Examiner's motivation to combine the descriptions of Hayashi et al. and the Shakuda is respectfully traversed.

Claims 5,7-8, 12-14, and 17-20 are allowable by virtue of their dependence upon an allowable independent claim. Therefore, withdrawal of the rejection of Claims 5, 7-8, 12-14, and 17-20 is respectfully requested.

**Conclusion**

In view of the aforementioned amendments and accompanying remarks, claims 1-3, as amended, are in condition for allowance, which action, at an early date, is requested.

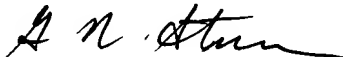
If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made

**IN THE CLAIMS:**

Please amend claims 1-3 as follows:

**1. (Amended)** A semiconductor laser device comprising:

a first nitride based semiconductor layer including a first conductivity type cladding layer and  
an active layer and containing at least one of boron, aluminum, gallium, indium and thallium;

a current blocking layer, formed on said first nitride based semiconductor layer, having a  
striped opening; and

a second nitride based semiconductor layer, formed on said first nitride based semiconductor  
layer in said striped opening, including a second conductivity type cladding layer and containing at  
least one of boron, aluminum, gallium, indium and thallium, wherein

said current blocking layer includes a multilayer structure of at least one first layer of a nitride  
based semiconductor containing at least one of aluminum and boron and at least one second layer of  
a nitride based semiconductor containing indium and having a smaller band gap than said first layer.

**2. (Amended)** The semiconductor laser device according to claim 1, wherein

said at least one first layer of a nitride based semiconductor has a larger aluminum  
composition ratio than that of said at least one second layer of a nitride based semiconductor or a  
larger boron composition ratio than that of said at least one second layer of a nitride based  
semiconductor, and

said at least one second layer of a nitride based semiconductor has a larger indium composition ratio than that of said at least one first layer of a nitride based semiconductor.

**3. (Amended)** The semiconductor laser device according to claim 1, wherein

said first nitride based semiconductor layer further includes a [first] second conductivity type cladding layer[,] provided between said active layer and a second conductivity type [first] second conductivity type cladding layer in [this order, and] said second nitride based semiconductor layer [includes a second conductivity type second cladding layer].